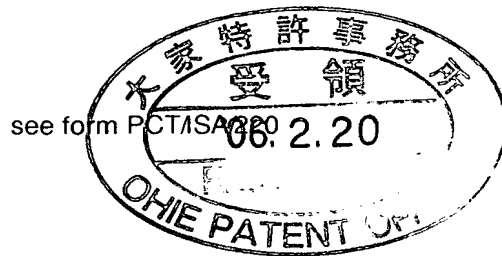


PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:



see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2005/006219

International filing date (day/month/year)
24.03.2005

Priority date (day/month/year)
25.03.2004

International Patent Classification (IPC) or both national classification and IPC
C01G23/00, H01G4/12, C04B35/468

Applicant
SHOWA DENKO K.K.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2005/006219

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2005/006219

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-32
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-32
Industrial applicability (IA)	Yes: Claims	1-32
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

D1: EP1231186

D2: WO03004416

D2a: EP1415955 (Later published, family member of D2)

Novelty

1.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (see paragraphs 5, 12 to 23, 38 to 50, examples 1-3 and claims 1-11) a method to obtain fine particles of titanium dioxide by a vapour phase process. The subject-matter of claim 1 therefore differs from this known D1 in that TiO_2 particles are further treated with an alkaline earth metal compound in an alkaline solution so as to obtain a perovskite type compound. Thus the subject-matter of claim 1 is novel according to Article 33 (2) PCT. Dependent claims 2 to 16 also satisfy the criteria of novelty

1.2 The same arguments can be applied *mutatis mutandis* to the subject-matter of product claim 17. Hence the subject-matter of claim 17 and dependent claims 18 to 32 is novel according to Article 33 (2) PCT.

Inventive step

2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 to 32 does not involve an inventive step in the sense of Article 33(3) PCT for the following reasons:

Claim 1

2.1 The problem to be solved by the present invention may therefore be regarded as how to modify the known vapour phase grown titania particles of D1 so as to obtain a perovskite type compound suitable for electronic material. The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons: document D2 discloses (see paragraphs 11 to 12, 15, 17, 20 to 21 and 29 to 32, examples 1 to 9 and claims 1-14) a process to obtain a barium titanate having excellent electric properties by reacting a titanium oxide sol with a barium compound in an alkaline solution containing a basic compound.

2.2 The applicant did not show the existence of a technical effect over all the titanium perovskite containing compounds (see description: page 43 line 24 to page 45 line 14). Indeed, different perovskite type compounds produced according to the method of claim 1 display ferroelectric behaviour (see description: page 34 lines 13 to 17) whereas others, also falling under the method of claim 1 do not have ferroelectric behaviour (see page 45 lines 12 to 14).

2.3 The man skilled in the art would therefore combine the teachings of documents D1 and D2 when confronted with the above mentioned problem (see **2.1** and **2.2**).

Claim 2

2.4 Presently due to the structure of claims 1 and 2, the feature of claim 2 are a mere expression of the result of the method of claim 1, thus not inventive over the combination of documents D1 and D2.

2.5 The claim is furthermore not sufficiently clear as it does not appear how the result is to be achieved in terms of pertinent method steps (Article 6 PCT); the question of whether such pertinent method steps would be new and non-obvious when compared with the prior art clearly cannot be assessed in this opinion.

Claims 3 to 13

2.6 Dependent claims 3 to 13 do not contain any features which, in combination with the

features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, the reasons being as follows: the additional features of claims 3 to 13 have already been disclosed in document D1 (see paragraphs 5, 12 to 23, 38 to 50, examples 1-3 and claims 1-11).

Claim 14

2.7 Document Do is silent to the structure of titanium dioxide but since the method steps are identical to those of the present application it follows implicitly that anatase crystals have to be present in the titanium oxide nanoparticles. Thus, the subject matter of claim 14 is obvious.

Claims 15 and 16

2.8 Dependent claims 15 and 16 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, the reasons being as follows: the additional features of claims 15 and 16 have already been disclosed in document D2 (see paragraphs 29 to 32, example 1 and claims 3, 6 to 8).

Claim 17

2.9 Presently no inventive step according to Article 33 (3) PCT can be recognised to the subject-matter of claim 17: as shown above the method of claims 1 to 16 is considered obvious in view of the combination of documents D1 and D2. Hence, the man skilled in the art would obtain a titanium containing perovskite compound if he were to conduct the reaction between the vapour phase grown titania particles of D1 and a barium compound in an alkaline solution containing a basic compound as shown in D2.

Claim 18

The perovskite compound obtained by combining the teachings of D1 and D2 will inevitably exhibit ferroelectric behaviour since it is agreed with the applicant (see page 23 lines 1 to 19 of the present application) that it is a result of the preparation step (e.g depends on the

size of the particles).

Claims 19-32

The use of titanium containing perovskite in capacitors and other electronic components, due to their electric properties is common and thus no inventive step can be recognised.

Re Item VII

Certain defects in the international application

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D2 is neither identified nor described.